MR27V452D

262,144-Word x 16-Bit or 524,288-Word x 8-Bit
8-Word x 16-Bit or 16-Word x 8-Bit Page Mode One Time PROM

DESCRIPTION

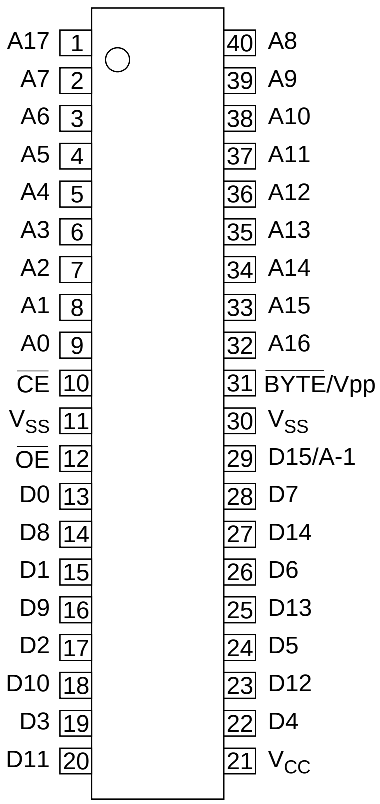
The MR27V452D is a 4Mbit electrically Programmable Read-Only Memory with page mode. Its configuration can be electrically switched between 262,144 word x 16bit and 524,288 word x 8bit. The MR27V452D operates on a single +3.3V power supply and is TTL compatible. The MR27V452D provides Page mode which can greatly reduce the read access time. Since the MR27V452D operates asynchronously , external clocks are not required , making this device easy-to-use. The MR27V452D is suitable as large-capacity fixed memory for microcomputers and data terminals. It is manufactured using a CMOS double silicon gate technology and is offered in 40-pin DIP , 40-pin SOP or 44-pin TSOP packages.

FEATURES

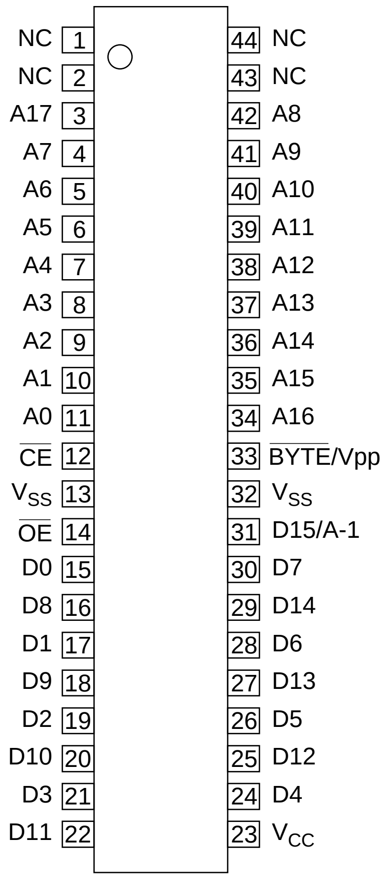
- 262,144 word x 16bit / 524,288 word x 8bit electrically switchable configuration
- Single +3.3V power supply
- Access time 100ns
  Page mode access time 30ns
- Input / Output TTL compatible
- Three-state output
- Packages

40-pin plastic DIP (DIP40-P-600-2.54)	(Product name : MR27V452DRP)
40-pin plastic SOP (SOP40-P-525-1.27-K)	(Product name : MR27V452DMP)
44-pin plastic TSOP (TSOP II 44-P-400-0.80-K)	(Product name : MR27V452DTP)

PIN CONFIGURATION (TOP VIEW)



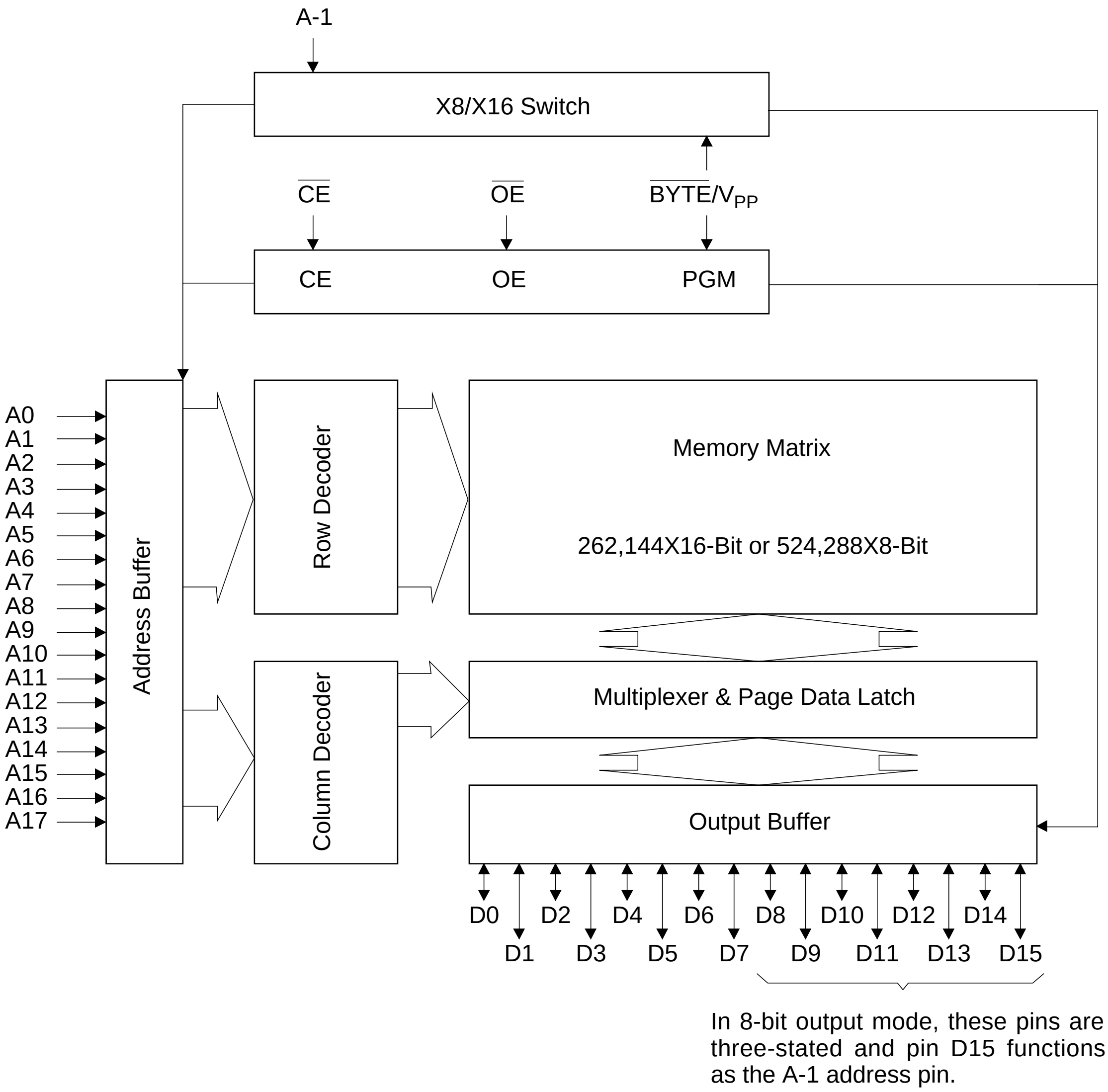
40-pin DIP , SOP



44-pin TSOP (II)

PIN NAMES	FUNCTIONS
D15/A-1	Data output / Address input
A0 - A17	Address input
D0 - D14	Data output
$\overline{CE}$	Chip enable
$\overline{OE}$	Output enable
V_{CC}	Power supply voltage
V_{SS}	GND
$\overline{BYTE}/V_{PP}$	Mode switch / Program power supply voltage
NC	Non connection

BLOCK DIAGRAM



FUNCTION TABLE

MODE	$\overline{CE}$	$\overline{OE}$	$\overline{BYTE}/V_{PP}$	V_{CC}	D0 - D7	D8 - D14	D15/A-1
READ (16-Bit)	L	L	H	3.3V	D_{OUT}		
READ (8-Bit)	L	L	L		D_{OUT}	Hi-Z	L/H
OUTPUT DISABLE	L	H	H		Hi-Z		
			L				*
STAND-BY	H	*	H		Hi-Z		
			L				*
PROGRAM	L	H	9.75V	4.0V	D_{IN}		
PROGRAM INHIBIT	H	H			Hi-Z		
PROGRAM VERIFY	H	L			D_{OUT}		

* : Don't Care

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Condition	Value	Unit
Operating temperature under bias	Topr	-	0 to 70	°C
Storage temperature	T_{stg}		-55 to 125	°C
Input voltage	V_I	relative to V_{SS}	-0.5 to V_{CC} + 0.5	V
Output voltage	V_O		-0.5 to V_{CC} + 0.5	V
Power supply voltage	V_{CC}		-0.5 to 5	V
Program power supply voltage	V_{PP}		-0.5 to 11.5	V
Power dissipation per package	P_D	-	1.0	W

RECOMMENDED OPERATING CONDITIONS FOR READ

(Ta=0 to 70°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
V_{CC} power supply voltage	V_{CC}	V_{CC}=3.0V-3.6V	3.0	-	3.6	V
V_{PP} power supply voltage	V_{PP}		-0.5	-	V_{CC}+0.5	V
Input "H" level	V_{IH}		2.2	-	V_{CC}+0.5*	V
Input "L" level	V_{IL}		-0.5**	-	0.6	V

Voltage is relative to Vss

* : Vcc+1.5V (Max.) when pulse width of overshoot is less than 10nS.

** : -1.5V (Min.) when pulse width of undershoot is less than 10nS.

ELECTRICAL CHARACTERISTICS (Read operation)

DC Characteristics

(V_{CC}=3.3V±0.3V, Ta=0 to 70°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input leakage current	I_{LI}	V_I=0 to Vcc	-	-	10	µA
Output leakage current	I_{LO}	V_O=0 to Vcc	-	-	10	µA
V_{CC} power supply current (Standby)	I_{CS1}	$\overline{CE}=V_{CC}$	-	-	50	µA
	I_{CS2}	$\overline{CE}=V_{IH}$	-	-	1	mA
V_{CC} power supply current (Read)	I_{CCA}	$\overline{CE}=V_{IL}$, $\overline{OE}=V_{IH}$ tc=100ns	-	-	70	mA
V_{PP} power supply current	I_{PP}	$V_{PP}=V_{CC}$	-	-	10	µA
Input "H" level	V_{IH}	-	2.2	-	V_{CC}+0.5*	V
Input "L" level	V_{IL}	-	-0.5**	-	0.6	V
Output "H" level	V_{OH}	I_{OH}=-400µA	2.4	-	-	V
Output "L" level	V_{OL}	I_{OL}=2.1mA	-		0.4	V

Voltage is relative to Vss

* : Vcc+1.5V (Max.) when pulse width of overshoot is less than 10nS.

** : -1.5V (Min.) when pulse width of undershoot is less than 10nS.

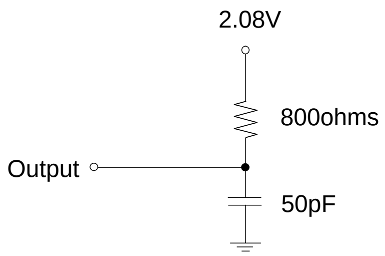
AC Characteristics

(V_{CC}=3.3V±0.3V, Ta=0 to 70°C)

Parameter	Symbol	Condition	Min.	Max.	Unit
Address access cycle time	T_C	-	100	-	ns
Address access time	T_{ACC}	$\overline{CE}=\overline{OE}=V_{IL}$	-	100	ns
Page access cycle time	T_{PC}	-	30	-	ns
Page access time	T_{PAC}	-	-	30	ns
$\overline{CE}$ access time	T_{CE}	$\overline{OE}=V_{IL}$	-	100	ns
$\overline{OE}$ access time	T_{OE}	$\overline{CE}=V_{IL}$	-	50	ns
Output disable time	T_{CHZ}	$\overline{OE}=V_{IL}$	0	30	ns
	T_{OHZ}	$\overline{CE}=V_{IL}$	0	25	ns
Output hold time	T_{OH}	$\overline{CE}=\overline{OE}=V_{IL}$	0	-	ns

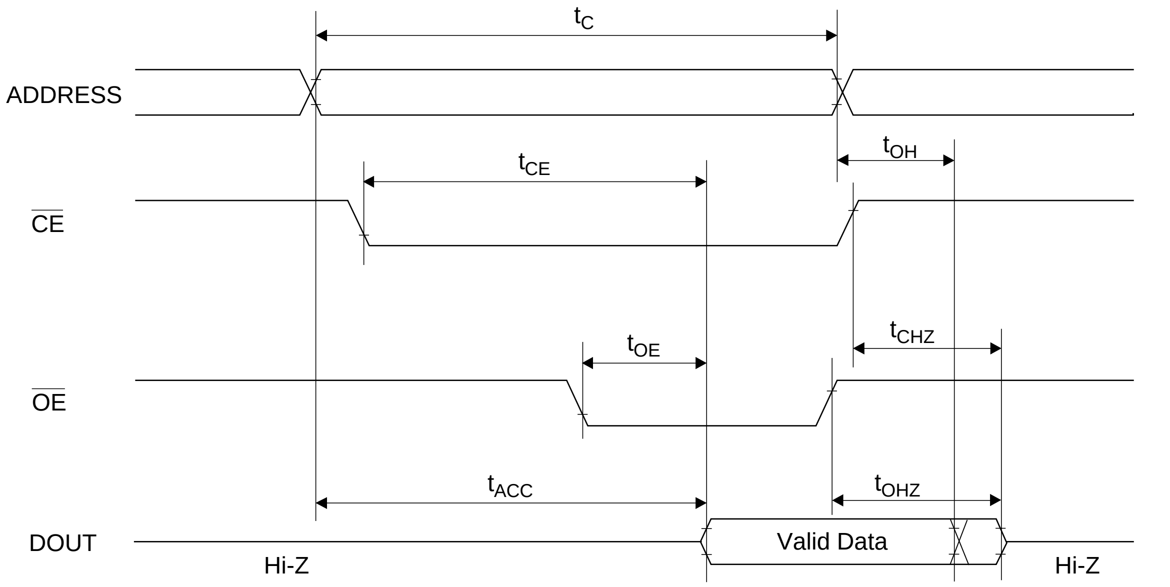
Measurement conditions

- Input signal level ---------------------- 0V/3V
- Input timing reference level ----------- 0.8V/2.0V
- Output load ------------------------- 50pF
- Output timing reference level ----------- 0.8V/2.0V

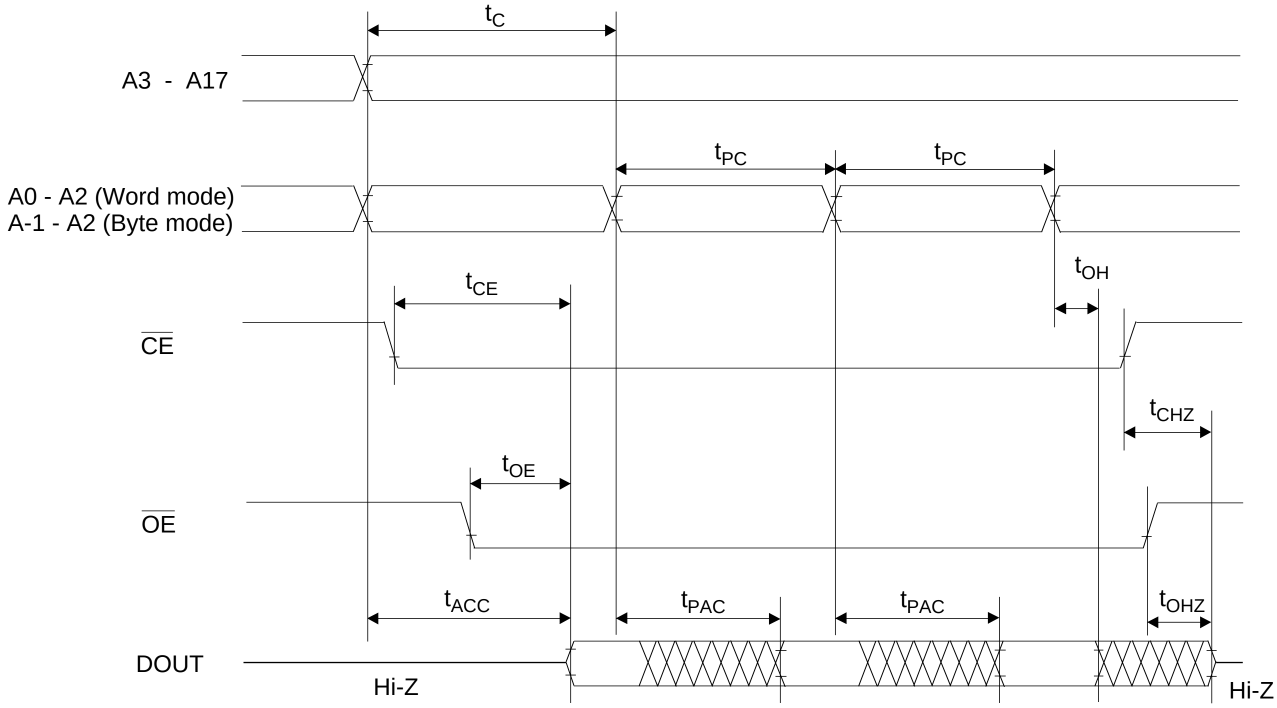


TIMING CHART

NORMAL MODE READ CYCLE



PAGE MODE READ CYCLE



ELECTRICAL CHARACTERISTICS (Programming operation)

DC Characteristics

(Ta=25°C±5°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input leakage current	I_{LI}	$V_I=V_{CC}+0.5V$	-	-	10	µA
V_{PP} power supply current (Program)	I_{PP2}	$\overline{CE}=V_{IL}$	-	-	50	mA
V_{CC} power supply current	I_{CC}	-	-	-	80	mA
Input "H" level	V_{IH}	-	3.0	-	$V_{CC}+0.5$	V
Input "L" level	V_{IL}	-	-0.5	-	0.8	V
Output "H" level	V_{OH}	$I_{OH}=-400µA$	2.4	-	-	V
Output "L" level	V_{OL}	$I_{OL}=2.1mA$	-	-	0.45	V
Program voltage	V_{PP}	-	9.5	9.75	10.0	V
V_{CC} power supply voltage	V_{CC}	-	3.9	4.0	4.1	V

Voltage is relative to Vss

AC Characteristics

(V_{cc}=4.0V±0.1V,V_{pp}=9.75V±0.25V,Ta=25°C±5°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Address set-up time	T_{AS}	-	100	-	-	ns
$\overline{OE}$ set-up time	T_{OES}	-	2	-	-	µs
Data set-up time	T_{DS}	-	100	-	-	ns
Address hold time	T_{AH}	-	2	-	-	µs
Data hold time	T_{DH}	-	100	-	-	ns
Output float delay from $\overline{OE}$	T_{OHZ}	-	0	-	100	ns
V_{PP} voltage set-up time	T_{VS}	-	2	-	-	µs
Program pulse width	T_{PW}	-	9	10	11	µs
Data valid from $\overline{OE}$	T_{OE}	-	-	-	100	ns
Address hold from $\overline{OE}$ high	T_{AHO}	-	0	-	-	ns

Pin Check Function

Pin Check Function is to check contact between each device-pin and each socket-lead with EPROM programmer.

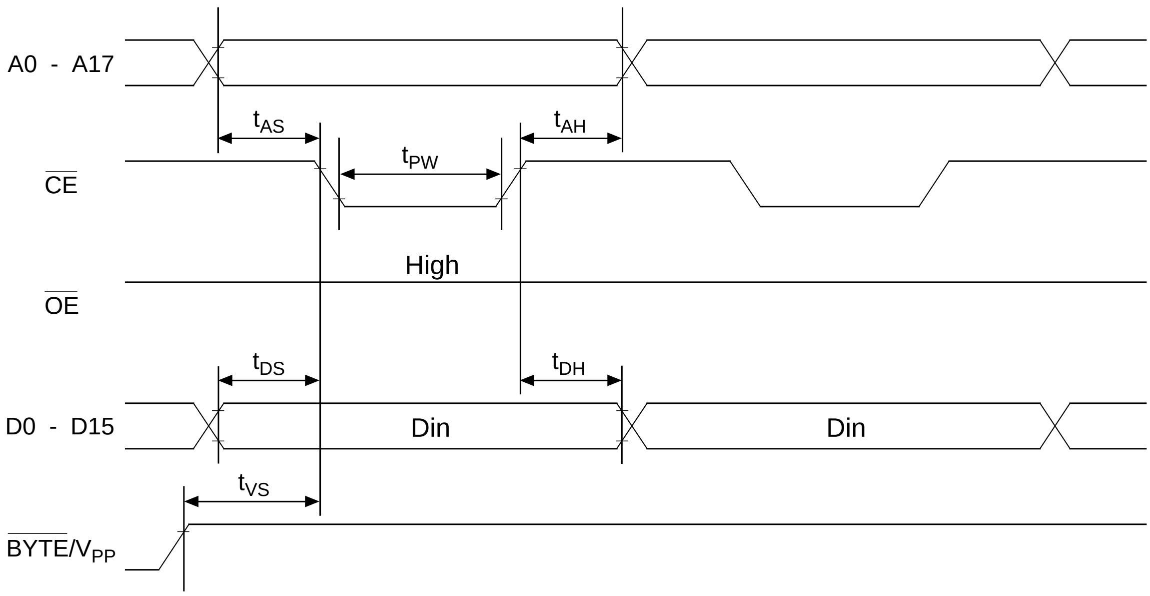
Setting up address as the following condition call the preprogrammed codes on device outputs.

(V_{cc}=3.3V±0.3V,$\overline{CE}$=$\overline{OE}$=V_{IL},$\overline{BYTE}$/V_{pp}=V_{IH},Ta=25°C±5°C)

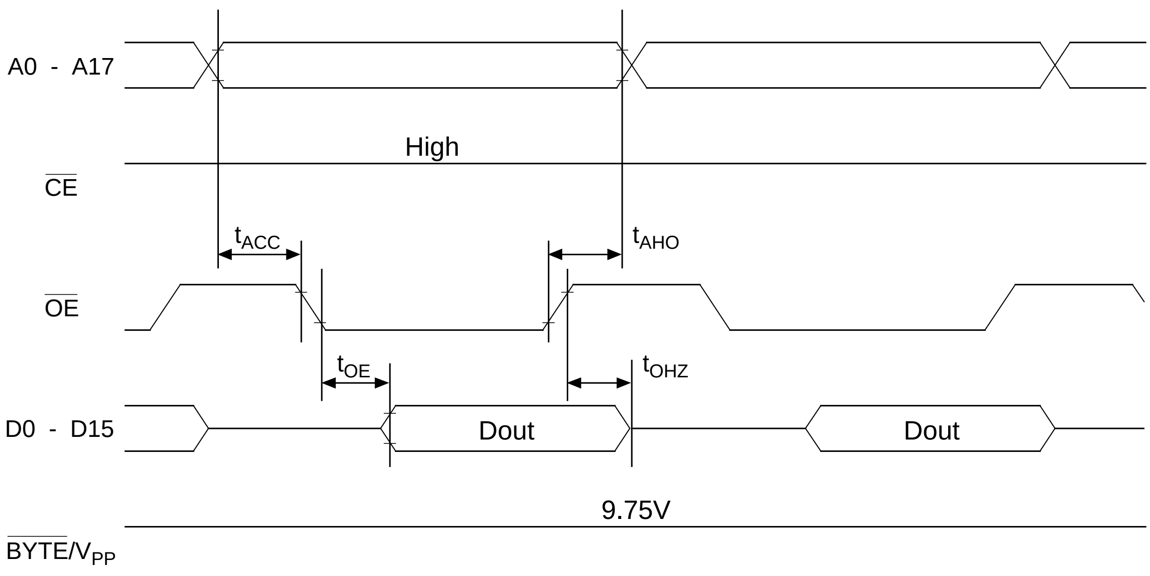
A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	DATA
0	1	0	1	0	1	0	1	0	VH*	0	1	0	1	0	1	0	0	FF00
1	0	1	0	1	0	1	0	1	VH*	1	0	1	0	1	0	1	1	00FF
Other conditions																		FFFF

* :VH=8V±0.25V

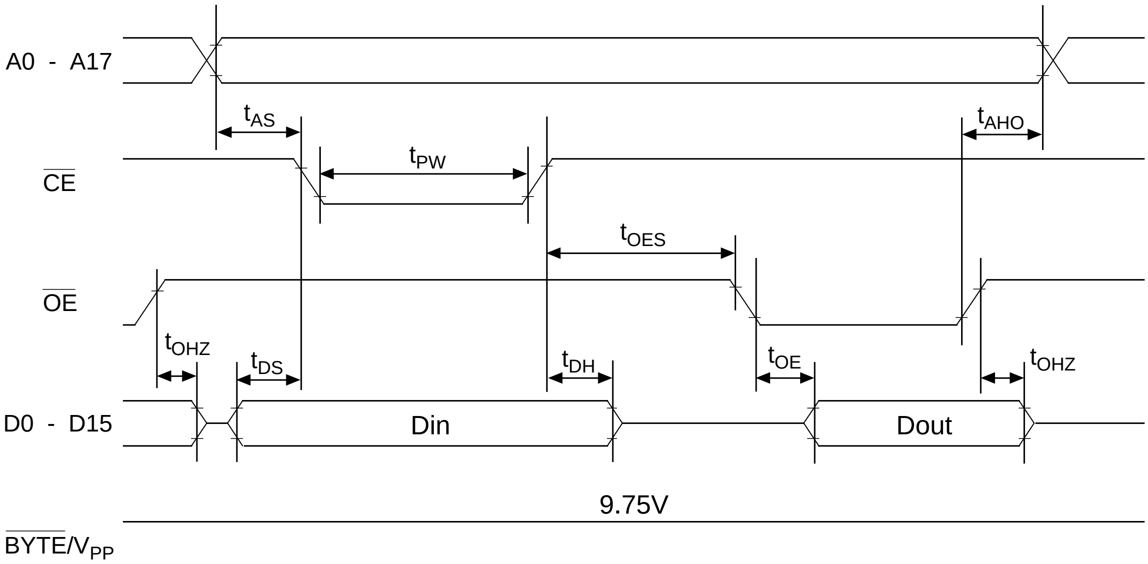
Consecutive Programming Waveforms



Consecutive Program Verify Waveforms



Program and Program Verify Cycle Waveforms



PIN Capacitance

(V_{CC}=3.3V, Ta=25°C, f=1MHz)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input	C_{IN1}	V_I=0V	-	-	8 (10)	pF
$\overline{BYTE}/V_{PP}$	C_{IN2}		-	-	60	
Output	C_{OUT}	V_O=0V	-	-	10 (12)	

(   ) : DIP only

Programming / Verify Flow Chart

Programming

Verify

